Cape Girardeau Bridge
Spanning the Mississippi River at
Missouri Route 146
Cape Girardeau
Cape Girardeau County
Missouri

HAER No. MO-84

HAER
MO
16-CAPGI,
6-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
Rocky Mountain Regional Office
National Park Service
P.O. Box 25287
Denver, Colorado 80225-0287

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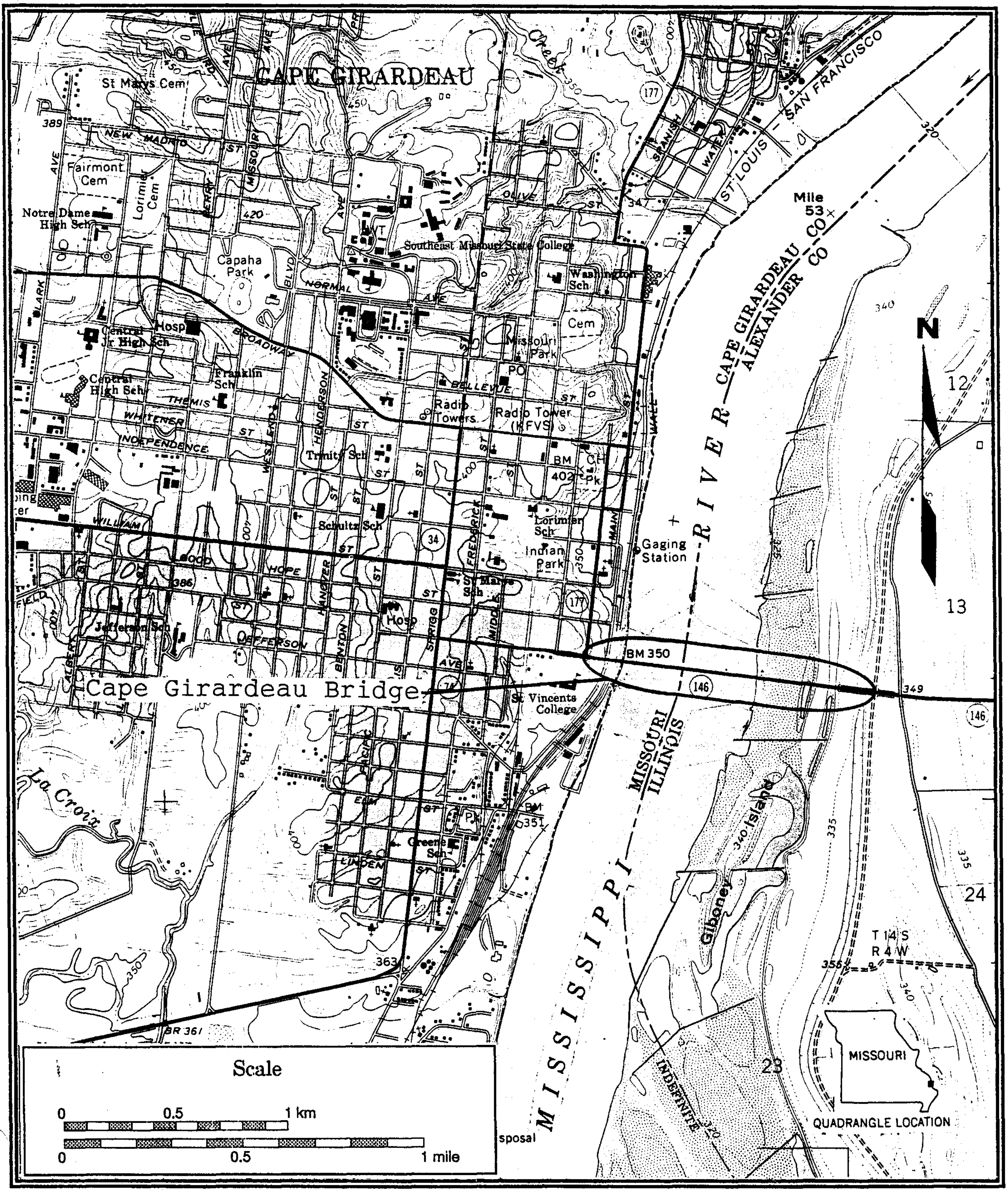
HISTORIC AMERICAN ENGINEERING RECORD
CAPE GIRARDEAU BRIDGE

Note: For shelving purposes at the Library of Congress, Cape Girardeau vicinity in Cape Girardeau County Missouri was selected as the "official" location for Cape Girardeau Bridge. The bridge is also located in East Cape Girardeau, Alexander, County, Illinois.

I. INTRODUCTION

Location:	Spanning the Mississippi River at Missouri Route 146, Cape Girardeau, Cape Girardeau County, Missouri, and East Cape Girardeau, Alexander County, Illinois
Construction Date:	1927-1928
Present Owner:	Missouri Highway and Transportation Department, Jefferson City, Missouri
Present Use:	Vehicular bridge, to be removed and replaced by a new vehicular bridge. Projected date of removal is 1998.
Significance:	The Cape Girardeau Bridge is a multiple-span structure over the Mississippi River. From west to east the bridge consists of six concrete deck girder spans, two plate girder spans, a continuous through truss forming two cantilevered channel spans of 671 feet, and six Parker through truss spans, for a total length of 4,744 feet. When completed the Cape Girardeau Bridge was distinguished as an important interstate link between southeast Missouri and the middle Mississippi Valley region. It stands as an excellent example of monumental steel truss construction spanning an important national riverway.
Historians:	Lawrence L. Ayres and David C. Austin, Design Division, Missouri Highway and Transportation Department, Jefferson City, Missouri, January 1995.


CAPE GIRARDEAU
St Marys Cem
Fairmont Cem
Lorimier Cem
Notre Dame High Sch
Capaha Park
Southeast Missouri State College
Washington Sch
Cem
Missouri Park
PO
Central Jr High Sch
Hosp
Central High Sch
Franklin Sch
Radio Towers
Radio Tower (KFVS)
BM 402
CH Pk
Trinity Sch
Schultz Sch
Lorimier Sch
Indian Park
Gaging Station
St Marys Sch
Jefferson Sch
Hosp
BM 350
Cape Girardeau Bridge
St Vincents College
BM 351
Greene Sch
La Croix
BR 361
MISSISSIPPI RIVER
CAPE GIRARDEAU CO
ALEXANDER CO
MISSOURI
ILLINOIS
Mile 53
SAN FRANCISCO
ST LOUIS
Island
Giboney
INDEFINITE
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13
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MISSOURI
QUADRANGLE LOCATION
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II. HISTORY OF THE CAPE GIRARDEAU BRIDGE

A. PRELUDE TO CONSTRUCTION

Cape Girardeau, Missouri, began as a trading post established by Louis Lorimier in 1793. Several American merchants and artisans soon settled around the post while Lorimier, among his other enterprises, maintained the village's first Mississippi River ferry. Cape Girardeau was formally laid out in 1806 as the seat of justice for Cape Girardeau District, Louisiana Territory. In October 1812, it became the county seat of Cape Girardeau County, one of the first five counties of Missouri Territory. When the county seat moved inland to Jackson in 1815, Cape Girardeau reverted to an insignificant river town. During the 1830s, however, with the development of steamboat traffic on the Mississippi River, Cape Girardeau became a major trading center for southeast Missouri and northeast Arkansas. By the time of the Civil War, Cape Girardeau was one of the largest river ports between St. Louis, Missouri, and Memphis, Tennessee. Sawmills, flour mills, and pork-packing houses were established along the riverfront. Cotton, grain, flour, livestock, meat, hides, and lard were among the major exports.[1]

After the Civil War, new railroad construction rerouted the region's commerce away from the Mississippi River. Cape Girardeau's own efforts to secure a railroad met with several failures and left the city deep in debt until 1887, when the Cape Girardeau Southwestern Railroad was successfully completed from Cape Girardeau to Poplar Bluff, Missouri, where it linked with the main branch of the St. Louis and Iron Mountain Railroad. In 1904-05, the Cape Girardeau and Northern Railroad was built from the Thebes Bridge in Scott County, Missouri, to Cape Girardeau, continuing on through Jackson and northwest to Perryville, Missouri. Soon after this connection was constructed, the St. Louis and San Francisco Railroad completed a line along the Mississippi River from St. Louis, through Cape Girardeau, to Memphis. This major transportation link, together with the other rail lines, greatly revitalized Cape Girardeau's economy.[2]

The city's population quickly increased by 76 percent--from 4,815 in 1900 to 8,474 in 1910--while the number of businesses doubled. By 1925, Cape Girardeau had grown into the sixth largest industrial city in Missouri, with a population of 16,000. It had thirty-one manufacturing plants and was one of Missouri's larger wholesale distribution centers. Streets were paved, sewer lines were established, the school system expanded, and utilities such as gas, water, and electricity were centralized.[3]

Paralleling the growth of Cape Girardeau in the early twentieth century was the growth of a new state transportation system. As in other parts of the nation, Missouri experienced an increasing reliance on automobile and truck transportation and the concomitant need for improved highways. Spurred by the

Federal Aid Highway Act of 1916, Missouri commenced construction of a modern road network following the passage of the Hawes Act in 1917 which provided for a state system of inter-county seat highways. A $60 million state road bond issue approved in 1920 and the Centennial Road Law of 1921 provided much-needed revenues and direction for continued state road construction. In this initial flurry of highway construction, Cape Girardeau gained U.S. Route 61, a major north-south highway stretching from Canada to the Gulf of Mexico, and State Route 74 which linked the city to Route 25, another primary state artery. Yet by 1925 these roads were at best graded and graveled, while between St. Louis and Memphis the only means for the growing numbers of vehicles to cross the Mississippi River were still the local ferries.[4]

The idea of a traffic bridge at Cape Girardeau first emerged during the early period of the state highway program. Upon becoming the president of the Cape Girardeau Chamber of Commerce in 1919, H. L. Albert declared that a bridge should be erected across the Mississippi River at Cape Rock, a bluff on the northern outskirts of the city. While Albert estimated that a bridge could be built for as little as $400,000, others were skeptical that a bridge was financially feasible, based on the 1905 construction costs of the nearby Thebes railroad bridge located fifteen miles to the south. The chamber appointed a committee to investigate the possibilities of building a bridge, but no reports ever followed.[5]

Prospects of a river bridge at Cape Girardeau faded until early September 1924, when Congressman James F. Fulbright of Doniphan, Missouri, announced he would submit a bill calling for a preliminary survey for a bridge at Cape Girardeau. While admitting that the potential success of the bill was "problematical," Fulbright believed that such a survey would induce cooperation among the state and federal governments to construct a span.[6] Although nothing would become of Fulbright's initiative, it apparently sparked another idea for a vehicular bridge across the Mississippi. A few days after Fulbright's announcement, Fred Naeter, the editor of Cape Girardeau's *Southeast Missourian* newspaper, printed the first of two editorials suggesting that a traffic bridge could easily be obtained by converting the Thebes railroad bridge into a double-use structure for vehicular traffic. Naeter asserted that a need existed for a traffic bridge at Cape Girardeau, not only for the growing number of local vehicles but more importantly for national traffic. He contended that conversion of the Thebes bridge would be entirely feasible, as evidenced by railroad bridges at Quincy, Illinois, and Memphis, Tennessee, both of which had attached roadways. Naeter noted that the costs of conversion would be relatively insignificant compared to the costs of a new structure, and argued that neither Missouri, Illinois, or the federal government had the necessary means to build a new span.[7]

The plan for converting the Thebes bridge soon gathered momentum. A quick review of the bridge charter showed it allowed for alterations to handle roadway traffic, and implied the Secretary of War could order the conversion as a matter of national defense. During a visit to Cape Girardeau in late September, the chief engineer of the Missouri State Highway Department, B. H. Piepmeier, came out in favor of the proposal. In October, James A. Barks, the mayor of Cape Girardeau, told the Rotary Club that a traffic bridge across the Mississippi River was the city's greatest need and urged them to promote the effort. In November 1924, Missouri voters approved Proposition 5 which increased state road revenues, further awakening the public mind to the need for better highways.[8]

It was this progressive climate of ongoing state road improvements and a quickening desire for a Mississippi River bridge that impelled the Cape Girardeau Chamber of Commerce to adopt the bridge project in late January 1925. The Chamber of Commerce, rather than the city government, was Cape Girardeau's most dynamic instrument for civic progress. Along with many other projects, the members agreed to pursue the prospect of having "wings" placed on either side of the Thebes railroad bridge to accommodate vehicular traffic.[9] Before acting on this and various other endeavors, however, the Chamber of Commerce spent the next several months in a membership drive, raising enough funds to hire a permanent secretary who could coordinate the chamber's diverse efforts. Meanwhile, citizens of Thebes, Illmo, and Fornfelt--small communities located adjacent to the Thebes bridge--took it upon themselves to have the structure modernized. They corresponded with the owners of the bridge and met with them in Chicago to discuss the matter, but without success.[10]

Possibly discouraged by these fruitless efforts of their neighbors, by mid-July 1925 the Chamber of Commerce Board of Directors, after several discussions, had dropped the idea of converting the Thebes bridge and had decided instead to investigate the possibility of building a new span at Cape Girardeau. As a first step, the chamber's new secretary, Ed C. Hackett, corresponded with Charles D. Matthews of the Missouri State Highway Commission, requesting that the commission study the possibilities of erecting a bridge and conduct a preliminary survey. Matthews promised to do what he could.[11] Three weeks later the Chamber of Commerce designated a bridge committee to pursue the project. The committee consisted of chairman Charles L. Harrison, president of both the Harrison Securities Company and the Southeast Missouri Joint Stock Land Bank; Fred A. Groves, owner of the Fred A. Groves Motor Company; William J. Kies, secretary-treasurer of the Southeast Missouri Lumber Company; James A. Barks, mayor of Cape Girardeau; H. H. Haas, a former mayor and Cape Girardeau's postmaster; and W. F. Bergmann, chairman of the Cape Girardeau Special Road District.[12] In

October, the bridge project was named a top priority in the chamber's official five-year program of agenda.[13]

The bridge committee conferred with Fred W. Adgate, chief consulting engineer of Foundations Company of America, a Chicago-based engineering firm. Adgate visited Cape Girardeau on November 20, and after viewing several potential bridge sites offered the committee a proposal. Adgate would conduct a survey, draw up preliminary plans, provide cost estimates, and help secure financial aid from the federal and state governments; in return, the committee would pay Adgate's expenses, which Adgate would refund if his firm was later chosen to engineer the structure. The Chamber of Commerce accepted the proposal and quickly solicited over $10,000 to pay Adgate's expenses. Adgate's firm began its work on December 7, 1925. Adgate submitted his report before the full membership of the Chamber of Commerce on January 20, 1926. A Mississippi River bridge extending from Morgan Oak Street could be built for approximately $1,500,000, Adgate declared. It was expected that the federal government could provide half the costs, and through a bond issue, Cape Girardeau County could finance the remainder. No direct help would be coming from the Missouri State Highway Commission, which lacked the authority to provide funds for any bridge over a navigable river. Nevertheless, the 400 members of the Chamber of Commerce were now determined to construct the bridge without delay.[14]

The bridge committee's next step was to secure a Congressional charter. Early in March, Representative Ralph E. Bailey and Senator Harry B. Hawes introduced the necessary legislation allowing the construction of a bridge at Cape Girardeau. By the end of April, the bill had been approved by the War Department and had passed both the House and Senate. On May 4, President Calvin Coolidge signed Public Law No. 172 granting consent to the Cape Girardeau Chamber of Commerce to "construct, maintain, and operate a bridge and approaches thereto across the Mississippi River."[15]

By this time the bridge committee was looking for private financial backers rather than to the state or federal governments to finance the construction. The day after Coolidge signed the bridge charter bill, the bridge committee began negotiations in earnest with several banking and investment firms. Over the summer, Harrison, as chairman of the committee, along with Groves, newly elected president of the Chamber of Commerce, and the chamber's secretary Hackett, met with financiers in Cape Girardeau and traveled to St. Louis and Chicago for additional conferences. They arranged for Harrington, Howard, and Ash, an engineering firm, to conduct a traffic survey showing that a toll bridge at Cape Girardeau would draw enough traffic to be a sound financial investment. They traveled through Illinois communities speaking with civic leaders and state officials, gaining assurances that the bridge would be connected with paved highways

on the east side. Specific details of the committee's activities were not divulged until August 20 when the committee revealed their progress before the larger Chamber of Commerce membership and the public in the Trinity Lutheran School auditorium.[16]

At the meeting, Harrison reviewed the progress made so far and explained the financial plan which had been developed. The bridge committee had contracted with the William R. Compton Company of St. Louis, a major investment firm, to underwrite $1,600,000 in funds for construction.[17] The majority of the costs for the bridge would be furnished through $1 million in twenty-year mortgage bonds bearing 6 percent interest. The Compton Company would also issue $300,000 in debentures at 7 percent interest. The Cape Girardeau Chamber of Commerce would have to raise the remaining $300,000 through the local sale of preferred stock paying 7 percent interest. Finally, 30,000 shares of common stock would be apportioned.

People at the meeting also heard from John L. Harrington of Harrington, Howard, and Ash who revealed the overall bridge design and its proposed location at the foot of Morgan Oak Street. Their traffic survey had predicted an average daily traffic of 450 cars (about 29,000 cars annually), which would generate enough revenue to pay for the bridge in fifteen years. Harrington said the bridge would make Cape Girardeau the gateway to the Ozarks, and would be the favored crossing for all through-traffic in the north-central and southwestern states.

The audience heard from Dan Weigle, a "civic evangelist" hired by Secretary Hackett to lead the campaign in the sale of the bridge stock. Congressman Bailey outlined the resulting growth, tourist trade, and "the linking of the East and West" which the bridge would bring. Charles Matthews of the Missouri State Highway Commission assured the group that the Highway Department would push the completion of Routes 74 and 61 as soon as possible, and that the bridge would serve as a national gateway to east-west through traffic. Mayor Barks spoke on the development and prosperity sure to result from the bridge. Calling it "a day of opportunity," he promised that Cape Girardeau's trading territory would increase by another 120,000 people and $60 million in purchasing power. All the speakers concurred that the bridge would be a sound investment, and the audience responded with high enthusiasm.[18]

Over the following two weeks the Chamber of Commerce, aided by Dan Weigle, organized a campaign to sell $300,000 of preferred stock in the Cape Girardeau Bridge Company which had yet to be incorporated. In a speech broadcast over the radio, Weigle spoke of city unity before a joint meeting of the Chamber of Commerce, Lions Club and Rotary Club, inspiring over 200 men to work full time in the sales drive. They divided into twenty-five teams, each with one "captain" and four "workers." Weigle drilled them in the finer points of salesmanship. The *Southeast Missourian*

printed full-page ads urging readers to invest in the bridge stock. Cape Girardeau banks arranged to loan investment money at low interest rates. A "Quota Committee" compiled lists of prospective investors. Before the sales drive officially began, over $100,000 in stock had been sold at $100 per share; the names of the investors were posted in the window of the Missouri Utilities Company.[19]

The sales drive began on Monday, September 6. Each sales team was assigned a particular section of the city to canvass, armed with the names of each resident. Other teams were sent to solicit in outlying communities and in rural areas. Harrison traveled to St. Louis to interest larger financiers in the project. The sales teams reconvened for lunch at the Hotel Idan-Ha and reported on their progress before spreading out again for the afternoon campaign. At the end of the first day, $75,000 in bridge stock had been sold. As the intense sales drive continued through the week, the majority of the community proved to be solidly behind the bridge project. At the salesmen's luncheon on Friday, September 10, Harrison announced the quota had been surpassed, with $388,900 of stock sold. The announcement brought ". . . a wild burst of enthusiasm, ear-splitting cheers, and for a time pandemonium reigned . . ."[20]

That evening some 10,000 townspeople reveled in a "spontaneous celebration" arranged by the bridge committee. A mile-long parade wound through the principal streets, with bands, fire trucks, and dozens of automobiles carrying the sales teams. The parade ended at Fairground Park where Hackett, Weigle, Groves, and Harrison were applauded for their efforts. A huge bonfire consumed an old hearse bearing the message, "Old Man Failure Died Today." It was reportedly the city's ". . . noisiest and most spontaneous outburst of enthusiasm . . ." since the end of the World War.[21]

Over the next several weeks Harrison and the bridge committee members worked with the Compton Company to incorporate the Cape Girardeau Bridge Company. They forwarded the preliminary bridge plans to the War Department for its approval. Harrington, Howard, and Ash, who had received the engineering contract, conducted detailed ground surveys and began drawing up the final bridge plans. Stock subscriptions continued to come in until close to $408,000 was pledged. This allowed the Compton Company to renege the proposed $300,000 in debentures and issue $600,000 in preferred stock, permitting a quicker payment of dividends.[22]

On October 15, the Chamber of Commerce assigned all its rights pertaining to the bridge to the Cape Girardeau Bridge Company which had been formally incorporated on September 24.[23] Officers of the company consisted of prominent businessmen of Cape Girardeau and St. Louis. The company's president was Charles Harrison, former chairman of the bridge committee. Its

three vice presidents were Fred Groves, another former committee member, Clyde D. Harris,[24] and William R. Compton, Jr. Lyra Schroeder[25] served as treasurer, while the assistant treasurer was Alfred L. Harty.[26] Clyde A. Vandivort[27] served as secretary, and Thomas S. McPheeters[28] was assistant secretary. William R. Compton, Sr., Oliver J. Anderson, Alfred C. Dent, and Meredith C. Jones[29] were additional members of the board of directors.

One final hurdle came in early November when Major John Gotwals, district engineer for the War Department, held a public hearing in St. Louis to consider the application for the bridge construction permit. Some veteran rivermen in attendance, including the operator of the Cape Girardeau ferry, objected to the proposed positions of certain piers which they believed would interfere with navigation. Gotwals submitted his report and recommendations to his superiors in Washington.[30]

While the bridge company awaited the permit, they submitted the bridge plans and specifications to various contractors across the country. Eight construction companies responded with bids, which were opened in the Compton Company offices on December 4. The American Bridge Company had the low bid on the superstructure, while the U.G.I. Contracting Company submitted the low bid on the substructure. The two bids totaled $1,252,944. However, the contracts could not be awarded until the Compton Company received the $408,000 in stock subscription pledges. In what seemed a blatant oversight, the bridge company belatedly called in the stock subscription payments.[31] The War Department finally issued its permit on January 18, 1927, and as the stock payments trickled in, representatives of the U.G.I. Contracting Company arrived in late January to begin their preliminary work. On February 5, 1927, construction began on the first pier.[32]

B. CONSTRUCTION OF THE CAPE GIRARDEAU BRIDGE

During the first weeks of construction, the U.G.I. Contracting Company, headed by its resident engineer R. L. Stowell and superintendent W. J. Duffy, was hampered by a lack of machinery and equipment. While these materials were in transit to the bridge site, a small work force began excavations for the footings for Pier 1 on the west bank, and erected frame buildings nearby for offices and storage sheds. Even this initial work drew hundreds of curious spectators. In mid-February, a large construction crane arrived from Tampa, Florida, and later in the month, as the first pier's footings neared completion, a concrete mixer and the steel beam components of a concrete-hoisting tower arrived from Philadelphia, Pennsylvania. At the end of February an air compressor, hoisting engine, drill press, gravel bin, tower booms and supports were all shipped in, and the accompanying work force increased. In early March a derrick boat and two barges were towed in from the Ohio River valley, while

two steam boilers which arrived by rail were unloaded before throngs of onlookers. On March 18, Pier 1 was completed just hours after being struck by lightning. By this time, support pilings were being driven for Pier 3; the concrete-hoisting tower, mixing plant, and air compressor units were being assembled and installed on the river barges; and the first pre-assembled steel caisson weighing several hundred tons arrived by barge from St. Louis. At the same time, however, work on the bridge slowed because of increasingly high water.[33]

In late March 1927, continual rains quickly pushed the Mississippi River past flood levels. A record rise of over 7' in forty-eight hours first put the river past Cape Girardeau's flood stage of 30'-0" on March 21, forcing the bridge workmen to move their equipment to safety and suspend most operations. A river crest of 33'-3" a few days later was short-lived, as additional rains drove the river levels past 36' on April 5. The strengthening currents nearly carried away the steel caisson, still moored to now-submerged pilings in the main channel, after a number of its cables snapped. Hundreds of spectators witnessed a two-hour struggle to resecure the caisson to the derrick boat and reanchor it closer to shore. On April 15 the river reached 38'-0", the highest level since 1844. On April 20 the river crested at just over 40', then began receding. The U.G.I. Contracting Company was not able to resume its work on the substructure until May 7, when the river finally fell back below flood stage.[34]

Meanwhile, despite the record flooding, work on the west bridge approach was started in early April by Dan Munro, a Kansas City general contractor who had subcontracted this segment from U.G.I. Working under E. Howell, Munro's construction supervisor, a ten-man work crew progressed fairly rapidly on the construction of the approach's retaining walls, concrete bents, and concrete girders. Seemingly unhampered by a record-breaking 10-1/2" of rain in April, and another 9" of rain in May, by early June Munro's crew had the west approach nearly half-finished.[35]

More heavy rains kept the Mississippi River above flood stage through late May and much of June, halting all work on the channel piers. Anxious to accomplish something, U.G.I.'s work force drove the timber pilings for Pier 9, an open abutment on the Illinois shore, and constructed the forms for its massive foundation. While waiting for the river to drop, the company prepared to double its work force, readied additional machinery, and brought in a new boat for the pier work. Finally on July 9, work on Pier 3 resumed after a three-month delay. The washed-out pilings were replaced or realigned, then the company's steamboat *Gillespie* aided by the ferry boat *A.C. Jaynes* moved the massive caisson back to the pier site and anchored it to its place between the pilings. More bad luck struck on July 19 when the barge carrying the heavy concrete-mixing plant to Pier 9 struck a snag and immediately sank in over 12' of water.[36]

Undaunted, the U.G.I. Company now used all its resources to put the project back on schedule. Within a week following the barge accident, a new, although smaller, concrete mixer was brought in and anchored next to the caisson for Pier 3. Under the "sinking boss" Jim Dennedy, nearly 100 men worked around the clock in eight-hour shifts manning the steam boilers and engines, and mixing and pouring the concrete in stages into the caisson chambers. As it filled, the caisson slowly sank to its precise location on the river bed, while wood falseworks for the pier column shafts and webwall were constructed upward from the top of the caisson. Once it reached the river bed, workmen known as "sand hogs" descended through a series of locks within a narrow cylindrical shaft to the caisson's curved bottom, and used pneumatic drills and pumps to excavate through the river sediment into bedrock. (Interestingly, workmen here uncovered a giant mastodon rib). The air pressure within the working chamber continued to increase as the caisson sank further downward, while temperatures inside climbed to as high as 130 degrees.[37]

Another sixty to eighty workers meanwhile prepared the wood framework inside the caisson for Pier 4; poured the concrete on Pier 9; and in early August began driving the support pilings for Pier 2's caisson. A diver worked to salvage the equipment from the sunken concrete-mixing plant; eventually it was rebuilt and placed on two new barges. High water temporarily halted the pier construction once again from mid-August to early September, but by September 6 the Pier 3 caisson had reached bedrock, its bottom had been sealed off, its work chamber filled, and the sinking of the Pier 4 caisson was underway. A steam-powered pile driver started driving steel sheet-piling for cofferdams which would be used instead of caissons in the construction of Piers 5 through 8. Once a cofferdam was in place, the timber foundation piles were driven with the aid of air jets which blew away the river sediments from around the pile bases. This pile driving would go on continuously twenty-four hours a day, its noise reverberating through Cape Girardeau like "the pecking of an overgrown woodpecker." George Bolz, a Cape Girardeau contractor, at this time began his construction of the Illinois approach, subcontracted from U.G.I., using the engines of four Fordson tractors parked on a barge to pump sand from the river bottom to form the 800'-long approach embankment from the river bank eastward to the levee.[38]

Crews of the American Bridge Company, contractor for the bridge superstructure, arrived in Cape Girardeau in mid-September and began erecting their offices and storage buildings under the direction of superintendent Frank C. Haley. A thirteen-ton locomotive crane unloaded carloads of arriving steel, while short spur lines were built out underneath the west approach. With only Piers 1 and 9 completed, U.G.I. now increased its work force to over 180 men and rushed its work to keep ahead of the steelworkers. The columns of Pier 3 rose closer to water level,

while the Pier 4 caisson reached bedrock and was sealed, and the Pier 2 caisson was readied for sinking. Over on the east approach, Bolz's work was suspended after September 26 when some gasoline on his pumping barge exploded. The resulting fire completely destroyed his tractors and pumps.[39]

The construction of the superstructure began on October 3, 1927. With the huge locomotive crane placed on the adjacent spur tracks, the American Bridge Company quickly erected Bent A, a steel bent, as the central support for two plate girder spans. The following day crowds gathered as the crane lifted and set in place the four plate girders--each weighing some fourteen tons--which together extended over 185' between the west approach and Pier 1. Metal pins temporarily held the girders in place as the stringers, floor beams, and lateral braces were set, then gradually the steel pieces were riveted in place and the pins removed. In preparation for the erection of the first truss span, workers next assembled an electric hoist adjacent to Pier 1. This would be used in constructing temporary wooden trestlework to support the truss members as they were positioned.[40]

As work on the piers continued, the column shafts of Piers 3 and 4 rose higher each day. The caisson for Pier 2 sank further into the riverbed, and after a two-week delay from high water levels, reached bedrock in late October. However, blasting of the rock proved necessary here in order to level off the caisson. The uneven bedrock below Pier 2 ended up extending about 16' deeper than originally thought, which prolonged the drilling and blasting of the bedrock through all of November and the first week of December until a level base was reached. By that time the column shafts of Pier 2 were already above water level as workmen toiled around the clock in building the forms during the day and pouring the concrete at night so that the approaching steel work would not be delayed. In the cold December air, the concrete was now heated before being poured to provide it with the correct strength, and was afterwards kept warm with blanketed steam pipes to ensure proper joining of the sections. Pier 4 was completed on December 2 while Pier 3 continued to rise. The cofferdam for Pier 5 had been pumped out and sealed, its timber foundation pilings lopped off, and its concrete shafts started. The steam hammer continued to drive the steel sheet-piling for the other eastern pier cofferdams and the timber foundation pilings within them.[41]

On November 12, Percy V. Pennybacker, an engineer from Harrington, Howard, and Ash who had overseen the bridge construction since the beginning of the project, sent a letter to the editor of the *Southeast Missourian*. Pennybacker wished to dispel several rumors concerning the bridge work which he noted were turning up with increasing frequency. Among the rumors were that Pier 9 was in the wrong position and that Piers 3 and 4 were not really on bedrock. This latter story may have been started

by an Illinois fortune teller who claimed that one of the piers was constructed on shifting sand. Pennybacker also denied that the caisson for Pier 2 had fallen over and would have to be dynamited, explaining that the delay in its completion was caused by the uneven bedrock.[42]

With a work force of about seventy-five men, the American Bridge Company had built a course of timber bents extending about 260' out from Pier 1 to support the first series of truss panels. Riveters joined the steel members once they were positioned. At the end of the wood falsework, and 130' beyond that, two temporary steel towers were erected in the riverbed for the bridge support. Cranes positioned on the ends of the lower and upper chords lifted the truss members in place. Rails were placed along the bridge floor as it advanced to transport the cranes and the steel pieces. By the end of 1927 the first span reached about halfway out to Pier 2.[43]

During January 1928 both work forces made rapid progress on the piers and truss spans despite delays from dangerous ice floes. Workmen from U.G.I. finally completed Pier 2 just before the crews of American Bridge extended the first through truss to the pier. The wood bents and one of the steel towers underneath the span were removed, temporarily placing most of the weight on the second steel tower until Pier 2 had been reached. The steel tower support was then advanced to the midpoint between Piers 2 and 3. With Pier 3 finished in early January, U.G.I. focused on the remaining four piers. The pouring of concrete continued on Pier 5. Two dredgeboats opened and maintained a channel through a sandbar next to Piers 6, 7, and 8 to make these sites accessible to the equipment barges. Work on the east approach embankment also progressed as teams of horses and mules dragged "ditchers" across adjacent borrow pits and hauled the earth up to the embankment where a tractor equipped with a leveling board evened out the fill. Barges arrived loaded with riprap to protect the embankment from high water.[44]

The bridge work steadily advanced through February and March. Low water at the beginning of February proved favorable for continued work on the piers, but a later 10' rise in the river interrupted the pile driving on Pier 6 and the placing of riprap along the east approach. By early March, Pier 5 was completed, the column shafts of Pier 6 were ascending, and the foundation piles for Pier 7 were being driven. Meanwhile, as the second span of the continuous truss slowly approached Pier 3, more timber bents along with the central steel tower were constructed on the east side of the pier to temporarily support the first Parker truss span. Two accidents marred this period of construction in the late winter of 1928. On February 16 a workman's head was caught between a timber piling and the lead timber which guided it downward; he suffered only a slight concussion. On March 5, another U.G.I. employee, while pouring concrete, fell over 4' onto the steel cofferdam, breaking several

ribs. (The safety of the American Bridge Company workers, incidentally, depended on a man in a small skiff continually anchored downstream, prepared to rescue any steelworker who fell into the river).[45]

By the middle of March the two spans of the continuous through truss were completed. Painters began applying the first coat of brown paint. Span 3 was underway; it and the five other Parker truss spans would go up relatively quickly because of the shorter lengths of their steel members. The placement of riprap around Pier 9 essentially completed the east approach embankment. The pier work reached its final stages at the end of March by which time only Pier 8 and the coping on Pier 6 remained.[46]

In early April, when a sudden 4'-rise in the river threatened to flood the cofferdam of Pier 8, U.G.I. mustered all its forces to fight the waters to avoid any further delays. All available men were called out, including the company's office workers. As the river climbed to within 15" of the top of the cofferdam, three boats were positioned alongside to break incoming waves. Three water pumps worked to keep the cofferdam dry instead of the usual one pump. Beginning at the base of the pier about 20' below the water level, workmen began pouring the column shafts. New wood forms were built and set as fast as the concrete could be poured. In a thirty-six hour period, four sets of forms were placed, and the pier shafts rose 42' from the pier base safely above the rising river. Nine days later, on April 16, U.G.I. completed the bridge substructure with a final pouring on Pier 6. Whistles on the company's fleet blew in celebration.[47]

On the same day the piers were completed, the American Bridge Company completed Span 4. The following day the steel support tower was advanced midway between Piers 5 and 6, and Span 5 was begun. Most of the U.G.I. fleet--a mixer boat, compressor boat, two steel barges, five wood barges, and two cement barges--prepared to float down to Vicksburg, Mississippi, where the company would build the substructure for a combined highway and railway bridge crossing the Mississippi River. About forty-five men stayed behind to strip the wood forms remaining around the piers and smooth down the shaft surfaces, while a steamer and derrick boats pulled up the steel cofferdams.[48]

The American Bridge Company progressed unimpeded on the remaining four Parker truss spans. Span 5 was finished in early May, and on June 13 the last piece of steel was placed on the end span, Span 8. Final riveting and installation of the steel railings would continue for another two weeks, then the American Bridge crews followed U.G.I. Contracting Company to the Vicksburg bridge site. Painting of the spans would last into July as the entire structure received two coats. One accident had occurred in the final days of the span construction. A steelworker was descending from the floor of Span 6, supporting himself from the

rail track, when a carload of steel ran over his arm; it was amputated the following day.[49]

Dan Munro, who had constructed the west approach, also received the subcontract for laying the concrete floor and asphalt pavement on the superstructure. This work began on July 7 on the Missouri side and proceeded east to the Illinois approach. The floor of the girder spans was laid within the first week. The work force of about forty men, led by construction superintendent William Buchanan, laid the concrete floor of the continuous truss in ten sections on alternating sides of Pier 2 to avoid undo stress on the spans. Haydite concrete, containing burned clay rather than stone, was used on these two spans because of its lighter weight. Concrete containing stone was used on the Parker spans, which were reached in early August. Trucks transported the concrete from a mixer stationed on the Missouri end of the bridge; once the reinforcing steel and the forms were laid, the Parker spans could be poured within a day. The concrete floor was completed on August 22. Atop the concrete, the bridge floor next received a first coating of ameisite asphalt. Two more accidents occurred during the paving work. One man was struck by lightning on August 15; he miraculously regained consciousness although he was initially unable to speak. The only death connected with the bridge construction followed the next day, August 16, when Charles Knight, age 28, fell from Span 8. His body was recovered a week later four miles downstream.[50]

As the bridge neared completion, attention turned to related aspects of the structure. In late April 1928, spurred by a citizens' petition, the Cape Girardeau City Council ordered the paving of four blocks of Morgan Oak Street from the bridge approach west to Frederick Street. The city engineer, E. L. Sailer, drew up plans calling for two 24'-0"-wide roadways, separated by a 19'-0"-wide landscaped parkway, to extend for the first two blocks west of the bridge. Sailer envisioned a circular parkway at the intersection with Lorimier Street on the north and the entrance to St. Vincent's Seminary on the south. Beyond this, the westernmost two blocks narrowed to a 40'-0"-width. The plans also included a retaining wall along the south side of Morgan Oak Street adjacent to the seminary campus. On June 19 the city council awarded the paving contract to F. W. Keller of Cape Girardeau, who began his work on July 5.[51]

The firm of Harrington, Howard, and Ash, which had designed and engineered the bridge, drew up plans for the toll house as the bridge construction approached its conclusion. In July, the bridge company officers approved the toll house design--a narrow, concrete structure with upper recessed decorative panels and a tile roof. The bridge company awarded the toll house contract to Gerhardt and Son, local contractors, who had submitted the low bid of $2,368. They began their work on August 7 with a stipulated one-month deadline.[52]

The bridge company officials also looked anxiously to Illinois for the promised highway link to the new bridge. The Illinois State Highway Department had confirmed their plans for Route 146 which would serve as the bridge's eastern connection, but at this late date they had yet to even select a route. The bridge company then took it upon themselves to build a temporary roadway out from the east approach to the town of McClure, Illinois--a distance of about six miles. Clyde Vandivort, secretary of the bridge company, personally supervised this construction which began on August 1. William Woods and Roy Cunningham of Cape Girardeau donated their time plus ten teams of horses and equipment to build a crossing over the levee and, with the aid of two tractors, graded the remainder of the temporary road to McClure. The bridge company also cajoled a disparate group of local Illinois officials to grade and repair a twenty-mile network of county roads from McClure to Illinois Route 2 at Jonesboro.[53]

In anticipation of the bridge completion, in June 1928 the Cape Girardeau Bridge Company and the Cape Girardeau Chamber of Commerce began planning elaborate dedication ceremonies set for September 3, Labor Day. In conjunction with the dedication, the festivities were to celebrate recent legislation authorizing $375 million for flood control along the Mississippi River. The bulk of the responsibilities in organizing the celebration fell on two men: Anthony A. Buford, a publicist employed by the bridge company, and W. F. D. Batjer, the chamber's new secretary. For several weeks Batjer traveled to dozens of communities in southeast Missouri and southern Illinois urging various civic groups and local leaders to participate in the celebration. Buford distributed 10,000 windshield stickers and posted large placards throughout the bi-state region advertising the new bridge and its upcoming dedication. Among others, invitations went out to Missouri Governor Sam Baker, Illinois Governor Len Small, U.S. Senator Harry Hawes, Secretary of War Dwight Davis, area congressional representatives, the mayors of St. Louis, Memphis, and New Orleans, and area community leaders.[54]

Over the summer, plans jelled for a "beauty queen" contest, a parade, a historical pageant, and many other events for the bridge dedication. Miss Dorothy Quarles authored the pageant script for over 100 cast members who began rehearsals in early August under the direction of Laura St. Ann Keller; others designed and sewed costumes, and devised the stage sets. A dozen towns each selected their Bridge Queen contestants by paying 10 cents per vote for favorite candidates. On August 13, Miss Agatha Mumma of Gideon, Missouri, won the title in a random drawing at Cape Girardeau's Broadway Theater. As the dedication day grew closer, various schools, civic groups and service clubs in Cape Girardeau and surrounding towns created floats for the planned parade. Eleven women's church groups prepared to run concession stands. A St. Louis firm hired by the Chamber of

Commerce decorated the principal streets, the railroad depot, the west bridge approach, and hundreds of businesses. The bridge company contracted with the Thearle-Duffield Fireworks Company of Chicago to provide a fireworks display. Secretary Batjer finalized the formal invitations to dignitaries, newspaper editors, automobile club representatives, and the mayors of eighty-two area towns. An outlying field was prepared as a landing strip for an Aero Squadron of the Missouri National Guard. The Service Company of the 140th Infantry, Missouri National Guard, agreed to volunteer its services. Cape Girardeau underwent a city-wide clean-up in anticipation of thousands of visitors.[55]

Amidst this flurry of activities, the final work on the bridge rushed ahead for the September 3 dedication. F. W. Keller, working on the Morgan Oak Street project, completed the south-side retaining wall and curbs during July, then with fifteen men and several horse teams, finished the sub-grade along the four-block length of the street. Keller began paving the street on August 11, starting from the end of the west approach. The first block was paved in a few days, and the second block within the week, but then rain interrupted the paving of the remaining two blocks. Since the concrete had to set for at least a week, it seemed doubtful that Keller would finish in time. But by August 29, the paving along Morgan Oak was done and Keller turned to the terracing of the circular and central parkways. Ornamental light poles were installed along the street, and electricians busily completed the wiring. At this time Dan Munro's crew began applying the first layer of asphalt on the bridge floor, proceeding rapidly across the Parker spans and the two spans of the continuous truss. Five trucks emanated out as far as 150 miles from Cape Girardeau with 300 signs advertising the new bridge. On the last day of August, sod was placed along the borders of the parkways while five large light poles were installed and wired. The City Improvement Association was ready with flowers to fill the remaining space. The toll booth construction had meanwhile proceeded apace, and was ready just in time for the bridge opening.[56]

The bridge opened for traffic early on the morning of September 3, 1928. Thousands of visitors began descending on Cape Girardeau, already crowded with 1,500 American Legionnaires attending a state convention. At 9:30, city officials and Chamber of Commerce officers boarded a private car at the railroad depot where they received the visiting dignitaries. Chief among them were Governor Sam Baker, Senator Harry Hawes, and Chicago City Attorney William D. Saltiel, representing Illinois. Also in attendance were members of the Missouri State Highway Commission and the Chief Engineer of the Missouri State Highway Department. Following the reception, the Cape Girardeau Municipal Band escorted the party to the Chamber of Commerce building. Soon they went on to the viewers' stand at the courthouse park from where they watched the main parade. Headed

by a troop of Illinois motorcycle police, over 700 automobiles and trucks, several bands, a drum and bugle corps, and scores of community floats made a circuitous route from the courthouse at Broadway and Main streets to the grounds of St. Vincent's Seminary. The dignitaries were meanwhile hustled onto a bus and shuttled to the speakers' platform in sight of the new bridge. At 11:43, Governor Baker and City Attorney Saltiel officially opened the bridge by untieing a silk ribbon strung across the west approach.[57]

Close to 15,000 people packed onto the seminary grounds--a natural, semi-circular amphitheatre--to attend the dedication ceremonies. Atop the speakers' platform, the Bridge Queen and her maids of honor were seated on canopied thrones. With Charles Harrison presiding, Mayor James Barks gave the welcoming address. Governor Baker then complimented the city on its proud achievement and reviewed the recent growth of southeast Missouri and its expanding highway network, adding his support to an upcoming highway bond issue. Senator Hawes remarked on the magnitude of the bridge project and the wisdom of the recent flood control legislation. Saltiel spoke of the unity between Missouri and Illinois symbolized by the new bridge. Following the speeches came the anticipated "Pageant and Masque of Progress." With the river as a backdrop, local thespians enacted four episodes of Cape Girardeau's history, interspersed with dance and incidental music from the Broadway Orchestra. The masque which followed allegorically depicted the past, present, and future progress of the city by the river. Through the afternoon a steady stream of cars crossed over the new bridge; most turned around on the Illinois approach and drove back again. Numbers of pedestrians also crossed the bridge for the first time, while a U.S. Army C-53 blimp passed overhead. At one point, a plane from the National Guard's Aero Squadron dove under the main span. All in all, it was one of the more memorable days in Cape Girardeau's history.[58]

The bridge closed the next day. During the following week the final surfacing of the Illinois approach was completed, another layer of asphalt was applied to the bridge floor, and the painters also finished their work. In the meantime the first three toll keepers were selected out of more than 300 applicants. Tolls were fixed at $1.00 per car and 10 cents per passenger. The bridge opened permanently at 6:00 a.m., September 12, 1928. M. J. Wagg, supervisor of the asphalt crew, proudly paid the first toll. Charles Harrison followed behind. Ironically, the bridge company's secretary, Clyde Vandivort, had the first flat tire on the bridge that afternoon.[59]

C. OWNERSHIP HISTORY

During its first few years of service, the Cape Girardeau Bridge failed to draw the amount of traffic necessary to make it

a profitable enterprise. Earlier estimates of 176,000 vehicles and $211,000 in revenues for the first year of operation proved unrealistic as the bridge tolls generated only $56,237. Second-year earnings were even less. Although the Great Depression may have been a contributing factor, the major reason for the continued dearth of traffic was Illinois' failure to build its promised connection to the bridge. Beyond the eastern approach, dirt and gravel roads persisted throughout southern Illinois, making travel to and from the bridge difficult at best. Without sufficient tolls, the bridge company could not make payments on the mortgage bonds or pay dividends on the preferred stock. Therefore, on June 24, 1932, the bridge company filed for receivership in federal court in St. Louis.[60]

When the Cape Girardeau Bridge Company went into receivership, Clyde A. Vandivort, the company's secretary, was named Receiver. In this position Vandivort became the bridge manager. He increased the toll rates, collected the receipts, and paid the bills and taxes. He pressured the Illinois Highway Department--with some success--to complete Route 146 and other area roads so that more traffic and more tolls could be generated. He sent out a representative who traveled cross-country from New York to Texas advertising the bridge at restaurants and gas stations. Still, Vandivort could not make enough payments on the bonds and accruing interest, and on February 12, 1935, the final decree of foreclosure and sale was entered in the U.S. District Court.[61]

At a public auction on April 8, the Cape Girardeau Bridge was sold for $850,000 to Industrial Securities, Incorporated, of Toledo, Ohio. (Judge James A. Finch, businessman Al Brinkopf, and other Cape Girardeau citizens had amassed a bid of $840,000). The court finalized the sale on June 24. Frank J. Stranahan, the owner of Industrial Securities, immediately assigned the title of the bridge to a new subsidiary, the Ozark Trails Bridge Company. Fred Groves, a past vice president of the Cape Girardeau Bridge Company, became the new manager.[62]

Within a few years after the sale the people of Cape Girardeau became rankled by the excessively high tolls charged by the Ozark Trails Bridge Company, and by the intransigence of its owner Stranahan. Cape Girardeau County officials resolved to regain local control of the bridge. On December 6, 1937, the county court entered into separate contracts with Clyde Vandivort and Bitting, Jones and Company, a St. Louis brokerage firm. Vandivort was authorized to negotiate the county's purchase of the bridge; if successful, he would again become bridge manager with his salary based on a percentage of the toll receipts. To finance the purchase, Bitting, Jones, and Company were prepared to buy revenue bonds issued by the county at 90 cents on the dollar, bearing 4 percent interest. The bonds eventually would be paid off through bridge revenues. This plan, however, met with several obstacles. Attempts to meet with the bridge owner

Stranahan were rebuffed until early February 1938. When Vandivort and representatives of the county court finally traveled to Toledo, they found Stranahan uninterested in selling. Later that month, over 100 citizens filed suit in circuit court seeking to set aside the contracts with Vandivort and the brokerage firm, summarily alleging they were not in the county's best interests. In March, Bitting, Jones and Company withdrew from their contract, as the revenue bonds had not been issued within the stipulated ninety-day period. While this attempt to regain the bridge failed, the county's determination did not waver.[63]

Condemnation was immediately considered as the next potential option. Cape Girardeau County initiated condemnation proceedings to acquire the bridge, but the validity of their action was successfully challenged in circuit court. The county then sought a Congressional bill giving it explicit authority to condemn and acquire the bridge in federal court. The War and Agriculture departments approved the bill, and it was quickly passed in the House, but met opposition in the Senate. Meanwhile, another Congressional bill gave Alexander County, Illinois--located opposite Cape Girardeau--the right to pursue its own acquisition of the bridge.[64]

Cape Girardeau County continued its fight. In June 1939 local citizens formed a Free Bridge organization to combat the high toll rates. In August the Cape Girardeau City Council considered buying the bridge, but the costs proved prohibitive. The city attorney, B. Hugh Smith, contacted the Missouri State Highway Commission in March 1940, asking the commission to assume control of the Cape Girardeau Bridge with the hope of it eventually becoming a free bridge. Nothing came of this effort, either. In November 1941, the city again pursued its possible purchase of the bridge after Fred Groves indicated that Stranahan was now willing to sell it. Mayor Hinkle Statler met with Stranahan and negotiated a price of $2,500,000--too much for the city council to even consider.[65]

Cape Girardeau's next opportunity to reclaim the bridge came after the end of World War II. By that time Stranahan had sold the Ozark Trails Bridge Company to the Sarjem Corporation of Chicago, which in turn was willing to resell the bridge. Both Alexander County and the Cairo (Illinois) Bridge Commission, a private entity, immediately expressed interest in purchasing it. Reportedly, Alexander County officials were poised to complete the transaction when Cape Girardeau residents first learned of the deal. Caught by surprise, the city and county of Cape Girardeau quickly filed an injunction suit to enjoin Alexander County from buying the bridge, while the city alone filed a second suit of condemnation with the avowed purpose of its buying the bridge.[66]

The last-minute legal maneuvers were successful. On June 8, 1946, the Cape Girardeau Special Road District, the body responsible for the county's road system, issued revenue bonds in the amount of the purchase price of $2,370,000. Sarjem Corporation, which specialized in such securities, assumed the bonds in exchange for the bridge. The agreement may have been facilitated by Fred Groves, who was chairman of the Special Road District as well the bridge manager for Sarjem. While all of the bonds were to mature in twenty-five years, the Special Road District could redeem the bonds at any time after four years. Once all the bonds were retired, the bridge by law would become toll-free.[67]

While under the ownership of the Cape Girardeau Special Road District, the bridge provided sufficient revenues to reduce the bond indebtedness fairly quickly. In 1955, less than a decade after assuming the bridge, the road district looked forward to retiring the debt and ending the tolls. At that time the district requested that the Missouri State Highway Commission accept the bridge after the last bonds were retired. The commission readily agreed, providing that the bridge was in good condition.[68]

A joint inspection of the Cape Girardeau Bridge took place on August 24, 1955. Participants included engineers from both the Missouri and Illinois highway departments, consulting engineers from the firm of Hardesty and Hanover, and the bridge manager for the Special Road District, George A. Penzel. Overall, the inspectors found the bridge to be in excellent condition, although the structure needed repainting and minor repairs. Together, the two states compiled a list of the work required of the road district before the states would assume ownership.[69]

Over the next year the road district worked rapidly through its list of required repairs and improvements. The Missouri State Highway Department meanwhile determined that Morgan Oak Street presented a hazardous curve in its approach to the bridge, and so redesigned the street to eliminate much of the central island parkway. In addition, provisions were made for removal of the toll house; the Special Road District agreed to bear the costs for this while the highway department would do the work.[70] By November 1956 the road district had completed its repairs on the bridge, but continued to collect tolls to pay off the last of its revenue bonds. Over the next six months the states of Illinois and Missouri along with the Special Road District drew up the bridge conveyance agreement. Illinois and Missouri worked out a separate maintenance agreement by which Missouri would perform the routine bridge maintenance while Illinois would contribute half the maintenance costs. The road district retired the last of the revenue bonds on June 1, 1957. In accordance, the Missouri State Highway Commission authorized acceptance of the agreements on June 12.[71]

At 5:30 a.m., June 29, 1957, tolls were finally lifted on the Cape Girardeau Bridge. The city once again turned out in celebration, with ceremonies including a parade, a beauty queen contest, and a ribbon-cutting at the bridge's mid-point. Since that time the bridge has been jointly maintained by the states of Missouri and Illinois.[72]

III. THE CAPE GIRARDEAU BRIDGE

A. BRIDGE DESCRIPTION

(See HAER Photographs MO-84-23 through MO-84-57 for construction drawings).

The Cape Girardeau Bridge (Bridge No. K-948R1) spanning the Mississippi River consists, from west to east, of a west approach of retained fill and six 30'-0"-long concrete deck girder spans; two plate girder spans totaling 185'-3" in length; a continuous through truss of two twenty-panel cantilever channel spans, each 671'-0" long; six Parker through truss spans, each 311'-8" long; and an east approach embankment about 1,029' long. The total length of the bridge is 4,744'-4". It has a 20'-0" roadway width (see Photographs MO-84-1 and MO-84-2). Its piers and spans are numbered consecutively from west to east. The superstructure components are riveted silicon steel and carbon steel. Substructure components are built of reinforced concrete.

A retained fill approach at the bridge's far west end extends approximately 52' east from Cape Girardeau's Spanish Street. It consists of a series of stepped concrete footings 1'-6" thick supporting reinforced concrete battered retaining walls. The widths of the footings increase from 5'-6" at the west end to 7'-9" at the east headwall, as the heights of the retaining walls increase in relation to the downgrade of the natural slope and the 5 percent upward grade of the roadway. Specifications called for sand fill between the retaining walls, with a 6" concrete paving base and asphalt pavement. The tops of the retaining walls form curbs 2'-0" wide and 10" above the roadway. Atop the curbs are 3'-0"-high crenelated concrete railings, with rounded endposts. From a width of 26'-0" at the west end of the approach where the toll booth was located, the roadway narrows to 20'-0" at the east headwall.

The east headwall is set on two reinforced concrete piles measuring 6'-0" x 4'-0" and extending below the 373'-0" elevation approximately 11'-6". The piles support 2'-0"-thick footings with horizontal dimensions of 7'-5" x 7'-10". Atop the footings and extending beyond the outer sides of the adjacent retaining walls are two large battered column bases which rise approximately 10', reaching the height of the curbs of the

retaining walls. Between these column bases, the east headwall, 1'-6" thick, seals off the retained fill. Two stepped, rectangular columns engaged to the face of the headwall constitute the abutment seat for the first concrete girder span.

Atop the headwall of the retained fill, a decorative portal marks the bridge's west entrance (see Photograph MO-84-3). The lower 3'-6" of the column shafts forming the entrance portal are 4'-0" square; near the height of the adjacent railings, the shafts are chamfered with 7" bevels, and rise 15'-4" to the bottom of the portal crossbeam, then taper to a 2'-6" width. Decorative poles and elaborate lighting fixtures adorn the portal's column shafts (see Photograph MO-84-4). The portal crossbeam, 5'-3" wide and 2'-0" thick, is embellished on either side with terra cotta ornaments (see Photograph MO-84-5), similar to one which decorated the Missourian Building at the Missouri State Fairgrounds in Sedalia. The entrance portal has a clearance height of 20'-0".

Beyond the west entrance portal are six concrete girder spans supported by open bents (Bents 1 through 6) constructed of reinforced concrete (see Photographs MO-84-6 and MO-84-7). Bents 1 through 5 are of similar design, though of variable dimensions; Bent 6 has an added cross strut and bridge seat for the connecting plate girder span. The bents are spaced at 30'-0" intervals and are progressively taller from Bent 1 to Bent 6. With a 5 percent upgrade from the headwall abutment to Bent 6, the roadway elevation climbs from 385.78' to 394.94'. Bents 1 through 5 have paired footings 5'-6" square and set on bedrock. Above the footings, bases for the bent columns are 3'-3" square and rise to various elevations commensurate to ground level. The paired column shafts at Bents 1 and 2 are 2'-3" square, and are spaced 21'-7" apart at their centers; Bents 3 through 5 have columns 2'-6" square, spaced 21'-4" apart. Bent 6 has larger rectangular footings, 7'-0" x 8'-0", supporting 5'-0" x 6'-0" column bases, and rectangular column shafts of 4'-0" x 5'-0". The centers of the shafts on Bent 6 are spaced 19'-10" apart. A 3'-6"-wide bowed cross strut at Bent 6 forms the 3'-0"-deep bridge seat for the connecting plate girder span.

The reinforced concrete girders are each 30'-0" long, 4'-2" wide and 1'-8" thick, with a curb width of 2'-2". Concrete floorbeams at each bent and at 10'-0" intervals between the bents are 3'-3" wide and 1'-2" thick. The girder spans have concrete railings similar to those on the retained fill approach. Expansion plates occur at the headwall abutment, Bent 3, and Bent 6. Flag poles with lighting fixtures are attached on either side of Bents 2 and 5.

Two web plate girder spans, labeled Span A and Span B, follow the concrete girder spans. The plate girders are supported in the center by Bent A, a steel bent (see Photographs MO-84-8 and MO-84-9). Bent A has paired concrete pedestals with

7'-0"-square footings and battered column bases approximately 5'-6" high, tapering to 3'-6" square. The bent columns are composed of two built-up channels (four angles with plates) with single lacing. The columns are spaced 19'-6" apart, and are connected with a sway brace system composed of two-angle lateral struts and diagonal braces, and single-angle vertical sub-posts. Span A, between Bent 6 and Bent A, consists of four-panel girders, each approximately 21'-8" in length, built with 86" web plates, two-angle flanges, two-angle splices, and single-angle stiffeners. Span B, between Bent A and Pier 1, has five panels, each 19'-2" long, composed of 96" web plates. Floor beams at the panel points of each of the two spans are 25" I-beams. Originally, two stringers between the girders were 20" I-beams. Lateral cross-braces and sway braces are composed of two angles. The girders initially had a 7" concrete pavement and 10" concrete curbs, with angle rail posts and 4" channel rails. The west end of Span A at Bent 6 rests on expansion bearings; the east end of Span B at Pier 1 is on fixed bearings. The roadway elevation along the two girder spans continues at a 5 percent grade, to an elevation of 404.2' at the end of Span B.

Piers 1 through 8, constructed of reinforced concrete, are battered column piers with solid web walls 2'-0" thick. Piers 1 through 4 rest directly on rock, while Piers 5 through 8 are on 40'-timber piles driven to rock.

Pier 1, which supports girder Span B and the west end of the continuous truss (see Photograph MO-84-14), has double foundation footings 15'-0" square and 5'-0" thick. The columns rise approximately 55' to the top of the coping which is 8'-2" wide. The west side of the coping forms a bridge seat for the end of Span B.

Pier 2, supporting the center of the continuous through truss (see Photograph MO-84-11), has a massive foundation 52'-0" wide, 26'-0" thick, and 40'-0" high. The column shafts which are 30'-0" apart at their centers rise over 108', tapering to a diameter of 9'-6". The coping above the shafts is 3'-6" high and 10'-0" wide, with its top set at an elevation of 405.6'.

Pier 3 also has a massive foundation, 51'-0" wide, 21'-0" thick, and 46'-0" high. Its columns rise over 112' to the top of the coping, which is 7'-0" high and 8'-0" wide. A top elevation of 406.5 feet provides a near-level gradient for the continuous truss (see Photograph MO-84-12).

Piers 4 through 8 all have similar dimensions except for their foundations--each built to achieve a top elevation of 305'-0"--and the relative heights of their columns which gradually decrease to provide a 2.8 percent downward gradient for the Parker trusses. Pier 4 has a foundation measuring 52'-0" wide, 18'-0" thick, and 42'-0" high. Its columns are spaced 23'-8" apart at their centers and rise over 96', tapering to a diameter

of 6'-8". The coping is 3'-0" high and has a top width of 7'-5". Piers 5 and 6 both have foundations 41'-0" x 22'-0" x 18'-0". Other dimensions are identical to those of Pier 4, except for the total height of the columns and coping: over 85' for Pier 5 and over 77' for Pier 6. Pier 7 has a smaller foundation of 40'-0" x 19'-0" x 18'-0", and a total column height of about 68'. Pier 8 (see Photograph MO-84-20), with a similar-sized foundation, is over 59' high.

Pier 9 on the east river bank is an open abutment with a foundation measuring 34'-6" long, 16'-0" wide, and 6'-0" thick, secured on 50' timber pilings. From a 12'-0" x 8'-0" wide base, the tapered abutment columns rise approximately 26' to form the 2'-10" wide bridge seat at an elevation of 355.7'. The centers of the columns are spaced 23'-8" apart. The backwall and wings are nearly 44' long and 2'-0" thick.

The main feature of the Cape Girardeau Bridge is the continuous truss which consists of two 671'-0"-long, twenty-panel channel spans, with a normal panel length of 33'-6". The two spans are cantilevered, with Pier 2 serving as the center support. The trusses are 30'-0" wide. (See Photographs MO-84-10 through MO-84-14). The inclined end posts, polygonal upper chords, and lower chords consist of two built-up channels (four angles with plates), with end tie plates, intermediate tie plates, and double lacing. The end posts and upper chords have added cover plates. The hip ends are 58'-0" high, and the center of the through truss at Pier 2 is 90'-0" high.

Diagonal web members extending between the upper and lower chords are two built-up channels with end tie plates. Those along the first ten panels have single lacing; the diagonals along the next eight panels have double lacing, while those within the four interior panels have double lacing and cover plates. Subdiagonal braces are 15" channels with end tie plates and single lacing. Vertical posts and intermediate hangers are 12" channels with end tie plates and single lacing. Hangers between the chords are four angles with top tie plates and single lacing. Horizontal struts are 10" channels with end tie plates and single lacing.

The portal struts are four angles with single lacing, end tie plates and bent top plates. Upper chord struts are four angles with end tie plates, and vertical and horizontal single lacing. Top laterals are four angles with single lacing and end tie plates. Bottom laterals consist of two angles. The four-story portal bracing (see Photograph MO-84-14) has three upper series of cross braces with center subposts, and one lower frame with diagonals, a bottom cross strut and lower corner braces; members are four angles with end tie plates and single lacing. Similar five-story portals occur at the truss's two center diagonals at Pier 2 (see Photograph MO-84-11). Sway frames

occurring at alternate panels are cross braces of two angles, with single lacing and end tie plates.

The floor system of the cantilever through truss (see Photograph MO-84-15) consists of 46" plate girder floor beams, three 26" and 28" I-beam stringers, and 8" I-beam crossbeams spaced every 3'-0" along each panel. The center of the through truss rests on fixed bearings and its ends are on roller expansion bearings. The bridge floor, 20'-0" wide, was originally paved with a 5-1/2" Haydite concrete slab topped with 1-1/2" of asphaltic pavement. It included concrete curbs 10" high and 6" wide, with angle rail posts mounted on the floor beams, and 4" channel rails.

The six Parker through truss spans are each 311'-8" long, with fourteen panels of 22'-3". The trusses are centered 23'-8" apart. The hip ends are 36'-0" high and the centers of the trusses are 48'-0" high. (See Photographs MO-84-16 through MO-84-20). The inclined end posts and polygonal upper chords are composed of two built-up channels with double lacing, cover plates, intermediate tie plates, and end tie plates. The lower chords are composed of two built-up channels with end tie plates; single lacing is found on the lower chords at the hip ends. The web members all consist of four angles with single lacing and end tie plates. The portal struts are four angles with bent top plates, bottom tie plates, end tie plates, and single lacing. Upper chord struts at all the panel points are four angles with single lacing and end tie plates. Upper laterals are two angles with single lacing and end tie plates. Bottom laterals are two angles. The portal bracing (see Photograph MO-84-19) consists of an upper cross frame of two angles with single lacing and end tie plates, and a lower K-frame with corner braces of four angles, single lacing, and end tie plates. Sway frames occurring at alternate panels are two-story cross frames of two angles with single angle subposts.

The floor system of the Parker spans (see Photograph MO-84-21) includes floor beams of 35" web plates with angle flanges, three 20" and 22" I-beam stringers, and 8" I-beam cross beams at 2'-9" intervals. The pavement and curbs were similar to those on the continuous truss, but with the narrower width of the Parker trusses the channel rails were attached to the truss members. Expansion joints occur at Piers 4 through 8. The ends of each truss are on alternating fixed and rocker expansion bearings with 6" pins (see Photograph MO-84-22).

The final 1,029'-3" of the bridge consists of an earth fill embankment forming the east approach. The 20'-0"-wide roadway continues at a 2.8 percent downward grade east from Pier 9. The embankment slopes are at a 2:1 grade, and form a 32'-0"-wide crown. The original pavement was a bituminous macadam surface on a 10" base of crushed rock. Original railings along the

embankment roadway consisted of wood posts spaced at 3'-0" intervals and wood plank railings.

B. MODIFICATIONS

The only significant modifications to the Cape Girardeau Bridge were made in 1963 when the original concrete paving and curbs on the plate girder spans and truss spans were removed. Along the plate girder spans, the original I-beam stringers were shifted to allow room for an additional 16" wide flange I-beam center stringer (see Photograph MO-84-9). Steel grid decking was laid across the entire lengths of the plate girder spans and truss spans. The grid decking was partially filled with lightweight concrete and was covered with asphaltic concrete. New 10"-high curbs also were constructed.[73]

IV. CONSTRUCTION CONTRACTORS

A. Harrington, Howard, and Ash

The consulting engineering firm of Harrington, Howard, and Ash designed and supervised the construction of the Cape Girardeau Bridge for the Cape Girardeau Bridge Company. Harrington, Howard, and Ash, based in Kansas City, Missouri, had been organized in 1915. Prior to their formal association, the three principal partners had each worked with John Alexander Low Waddell, one of the most prominent bridge engineers in the United States. Harrington, Howard, and Ash specialized in bridge engineering and designed numerous bridges over the Missouri, Mississippi, and other major rivers throughout the country and overseas.

John Lyle Harrington, the eldest member of the firm, was born in Lawrence, Kansas, in 1868. He graduated from Kansas University at Lawrence in 1895, receiving A.B., B.S., and C.E. degrees. Following his graduation he worked briefly with J. A. L. Waddell in Kansas City, then from 1896 through 1906 he held various engineering positions for numerous bridge, iron, and railroad companies in the eastern United States. He resumed his education at McGill University in Montreal where he received an M.S. degree in 1908. Meanwhile he joined with Waddell in January 1907 in forming the engineering firm of Waddell and Harrington where he remained through 1914.[74]

The second member of the firm, Ernest E. Howard, was born in Toronto, Canada, in 1880 and grew up in Texas. He attended the University of Texas, graduating in 1901 with C.E. and B.S. degrees. He soon joined the firm of Waddell and Hedrick in Kansas City as an associate resident engineer in charge of construction. He remained with the firm and its successor, Waddell and Harrington, until the formation of Harrington, Howard, and Ash in 1915.[75]

Louis Russell Ash, the firm's third partner, was born in Union County, Kentucky, in 1873. He received his education at the University of Arkansas, graduating in 1894 with bachelor degrees in civil and electrical engineering. He taught mathematics at Coe College in Cedar Rapids, Iowa, from 1895 to 1901. He then became an assistant engineer with Waddell and Hedrick. Meanwhile, he acquired his graduate degree in civil engineering in 1906 from the University of Chicago. After the dissolution of Waddell and Hedrick in 1908 Ash was an associate engineer with Ira Hedrick until 1910. He served as the city engineer for Kansas City from 1910 until 1913, then was an assistant engineer with Waddell and Harrington until the formation of Harrington, Howard, and Ash.[76]

Harrington, Howard, and Ash succeeded as a prestigious engineering firm specializing in bridge design. By the time of their involvement in the Cape Girardeau Bridge in 1926 they had designed well over 200 structures. Their later work included plans for several other major bridges across the Mississippi and Missouri rivers as the nation's highway network developed during the 1920s. Within Missouri, their designs included those of the Mississippi River bridges at Louisiana and Alton, and Missouri River bridges at Boonville and Bellefontaine. They also designed bridges crossing the Mississippi River at Natchez and Vicksburg, Mississippi.[77]

Harrington, Howard, and Ash dissolved their partnership in 1928 but all continued their careers in Kansas City. Harrington formed a new engineering firm--Harrington and Cortelyou--which still continues today (1995). Upon his death in 1942 Harrington was credited with the design and construction of over $1 billion worth of bridges in the United States, Canada, Russia, and New Zealand.[78] Howard and Ash continued their association in the firm of Ash, Howard, Needles, and Tammen. In 1930 Howard was attributed with having engineered over $80 million worth of bridge construction projects throughout North America and in Asia. Near the end of his career in 1952 he had participated in the designs of twelve Mississippi River bridges and a greater number over the Missouri River.[79] The firm continues as Howard, Needles, Tammen, and Bergendoff, offering engineering and architectural services.[80]

B. U.G.I. Contracting Company

The U. G. I. Contracting Company received the contract for the substructure of the Cape Girardeau Bridge. At that time U.G.I. (United Gas Improvement) was an affiliate of United Engineers and Constructors, Incorporated, of Philadelphia, Pennsylvania. After its work at Cape Girardeau, the company built the substructure for a combined highway and railroad bridge across the Mississippi River at Vicksburg, Mississippi, in 1928-29.[81] The company survives as UGI Corporation, an independent

company based in Norristown, Pennsylvania, with branch offices in Bethlehem, Lancaster, and Reading. This company now specializes in crude oil and natural gas extraction, petroleum refining, and industrial gases.[82]

C. **American Bridge Company**

The American Bridge Company constructed the superstructure of the Cape Girardeau Bridge. Financier and capitalist J. Pierpont Morgan had formed the American Bridge Company in 1900 by consolidating numerous bridge fabricators from across the northeastern United States. Among those bridge companies incorporated into the merger were the Berlin Iron Bridge Company of East Berlin, Connecticut; the Edge Moor Bridge Company of Wilmington, Delaware; the Groton Bridge and Manufacturing Company of New York City; the New Jersey Steel and Iron Company of Trenton, New Jersey; the Keystone Bridge Company of Pittsburgh, Pennsylvania; the Union Bridge Company of Athens, Pennsylvania; the Youngstown Bridge Company of Youngstown, Ohio; the Wrought Iron Bridge Company of Canton, Ohio; and the Milwaukee Bridge Company in Wisconsin, among others. The new company thus encompassed virtually all of the nation's major bridge fabricators. In 1901, the American Bridge Company became a division of Morgan's United States Steel Corporation. The giant conglomerate established offices throughout the country and effectively dominated steel-truss fabrication and bridge construction in the United States for decades, building thousands of vehicular and railroad bridges across the country.[83]

The American Bridge Company established its St. Louis office in 1902, and by 1917 had a separate structural iron works division in southwest St. Louis.[84] Soon after erecting the Cape Girardeau Bridge in 1928, the company completed the superstructures of several other Mississippi River spans: the Chain of Rocks Bridge at St. Louis, which opened in July 1929; the Cairo (Illinois) Bridge, completed in September 1929; and the Vicksburg, Mississippi, Bridge, finished in the summer of 1930.[85]

ENDNOTES

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2. Snider and Collins, Cape Girardeau, 260-264; Goodspeed, Goodspeed's History, 385, 415-416.

3. Allen H. Hinchey, comp., "Stories of Cape Girardeau," collection of newspaper clippings, 1932 (Columbia: Reference Library, State Historical Society of Missouri), n.p.; Robert S. Douglass, History of Southeast Missouri: A Narrative Account of its Historical Progress, its People and its Principal Interests (New York: Lewis Publishing Company, 1912), 261; Cape Girardeau Chamber of Commerce, Cape Girardeau Facts, (Cape Girardeau: Cape Girardeau Chamber of Commerce, 1925), n.p.; Snider and Collins, Cape Girardeau, 208-215.

4. Missouri State Highway Commission, Roads and their Builders (Jefferson City: Division of Public Information, Missouri State Highway Commission, n.d.), 75-78; Missouri State Highway Commission, Map of Missouri Showing State Road System, Route Numbers, Road Conditions, and Points of Interest (Jefferson City: Botz-Hugh Stephens Press, 1930).

5. Southeast Missourian (Cape Girardeau), 3 September 1928.

6. Ibid., 5 September 1924.

7. Ibid., 10, 12 September 1924.

8. Ibid., 17, 26 September, 14 October, 13 November 1924.

9. Ibid., 27 January 1925.

10. Ibid., 20 March 1925, 3 September 1928.

11. Ibid., 17 July 1925.

12. Cape Girardeau Chamber of Commerce, Cape Girardeau Traffic Bridge Dedication Program, 3 September 1928.

13. Southeast Missourian, 14 October, 10 November 1925.

14. Ibid., 21, 28, 30 November, 3, 4 December 1925, 20 January 1926.

15. Ibid., 6, 10, 16, 18 March, 5, 22 April, 4 May 1926; Legal summary, Part I, Cape Girardeau Bridge (Bridge No. K-948R1) File, Bridge Division, Missouri Highway and Transportation Department (MHTD), Jefferson City. Hereafter cited as Bridge File, MHTD.

16. Southeast Missourian, 22 April, 5, 8 May, 7, 15, 16, 24 June, 1, 28 July, 3, 7, 14 August 1926.

17. Harrison had direct, personal interests with the Compton firm. In January 1925, the Southeast Missouri Joint Stock Land Bank, in which Harrison served as president, had merged with the St. Louis Joint Stock Land Bank, founded by William Compton in 1922. Harrison then became a member of the board of directors of Compton's St. Louis bank. Ibid., 13 January 1925.

18. Ibid., 20 August 1926; C. D. Matthews to B. H. Piepmeier, 20 August 1926, Bridge File, MHTD.

19. Southeast Missourian, 21, 23, 24, 25, 26, 27, 31 August, 1, 2, 3, 4 September 1926.

20. Ibid., 6, 7, 8, 9, 10 September 1926.

21. Ibid., 11 September 1926.

22. Ibid., 10, 11, 13, 14, 17, 20, 24 September 1926.

23. Ibid., October 15, 1926; "Certificate of Incorporation, No. 46251," 24 September 1926, Cape Girardeau Bridge Company Papers, Corporations Division, Missouri State Information Center, Jefferson City.

24. Harris was president of the First National Bank of Cape Girardeau. Southeast Missourian, 26 February 1925.

25. Schroeder was a buyer for the William R. Compton Company. Polk-Gould Directory Company, Polk-Gould St. Louis Directory, 1926 (St. Louis: Polk-Gould Directory Company, 1926), 2032.

26. Harty was the president of the Southeast Missouri Trust Company, the Sturdivant Bank of Cape Girardeau, and the

Stoddard County Trust Company. Southeast Missourian, 11 September 1925.

27. Vandivort was a Cape Girardeau County Court Judge and manager of the Cape Girardeau Branch of the St. Louis Joint Stock Land Bank. Ibid., 31 December 1925.

28. In 1941, McPheeters was a lawyer with the firm of Bryan, Williams, Cave, and McPheeters of St. Louis. Floyd C. Shoemaker, ed., Missouri and Missourians: Land of Contrasts and People of Achievements (Chicago: Lewis Publishing Company, 1943), 4:89-91.

29. Anderson and Jones were associates with the investment banking firm of Lorenzo E. Anderson and Company, which helped in financing the project. Dent's business relationship is not known. Walter P. Tracy, comp., Men Who Make St. Louis the City of Opportunity (St. Louis: Walter P. Tracy, 1926), 66-67; Polk-Gould, Directory, 1926, 1420.

30. Southeast Missourian, 5, 6 November 1926; "Public Hearing on Proposed Bridge at Cape Girardeau, Mo.," U.S. Engineer Office, War Department, 4 October 1926; "Amended Notice, Notice of Public Hearing," U.S. Engineer Office, War Department, 4 October 1926, Bridge File, MHTD.

31. Southeast Missourian, 23 November, 4, 6, 7, 9 December 1926.

32. Ibid., 19, 29, 31 January, 3, 5 February 1927.

33. Ibid., 5, 7, 16, 23, 26 February, 7, 18, 19 March 1927.

34. Ibid., 19, 21, 22, 24 March, 2, 4, 5, 7, 15, 20, 27 April, 5, 7 May 1927.

35. Ibid., 7, 27 April, 19, 30 May, 4 June 1927.

36. Ibid., 30 May, 4, 7, 18 June, 9, 18, 19 July 1927.

37. Ibid., 18, 26 July, 5, 6 August 1927, 5 April 1928.

38. Ibid., 5, 15, 16 August, 6, 13 September 1927.

39. Ibid., 13, 22, 26 September 1927.

40. Ibid., 3, 4, 6, 11 October 1927.

41. Ibid., 3, 24, October, 11, 18, 28 November, 6, 9 December 1927.

42. Ibid., 12 November 1927; Mark Bliss, "Mississippi Bridge Spans History of River City," Southeast Missourian (Cape Girardeau), 4 March 1993, 1.

43. Southeast Missourian, 11, 24 October, 11 18, 28 November, 6, 31 December 1927.

44. Ibid., 18, 26, 30 January 1928.

45. Ibid., 6, 17, 25 February, 5, 17 March 1928.

46. Ibid., 17, 26, 31 March 1928.

47. Ibid., 7, 16 April 1928.

48. Ibid., 17, 25 April, 5 May 1928; "Seven New Mississippi River Highway Bridges, Engineering News-Record 105 (1930): 183-184.

49. Ibid; Southeast Missourian, 5, 22 May, 12, 13 June, 5 July 1928.

50. Ibid., 7, 12 July, 7, 15, 16, 22, 23 August 1928.

51. Ibid., 17 April, 9 May, 19 June 1928.

52. A drawing of the toll house appeared in the 25 July 1928 issue of the Southeast Missourian. Ibid., 2, 18, 25 July, 7 August 1928.

53. Ibid., 25, 26 July, 1, 7 10 August 1928.

54. Ibid., 21, 23, 26, 27, 29 June, 7, 10, 14, 16, 18, 21 July 1928.

55. Ibid., 2, 18 July, 7, 9, 10, 13, 14, 15, 21, 23, 24, 25 August, 1 September 1928.

56. Ibid., 6, 11, 14, 18, 24, 25, 29, 31 August 1928.

57. Ibid., 28 August, 3, 4 September 1928.

58. Ibid., 28 August, 1, 3, 4 September 1928; Bliss, "Mississippi Bridge," 1-2; Mary Harriet Talbut, "The Bridge that Spanned the Great Depression," Missouri Historical Review 88 (1994): 184.

59. Southeast Missourian, 4, 6, 7, 9, 11, 12, 13 September 1928.

60. Ibid., 9 February 1927; Talbut, "Bridge that Spanned the Great Depression, 185; Bliss, "Mississippi Bridge," 2; K. J. H. Cochran, "History of the Cape Girardeau Bridge," Jackson Journal (Jackson, Missouri), 17 July 1968, 2.

61. Talbut, "Bridge that Spanned the Great Depression," 185; Legal summary, Part IX, Bridge File, MHTD.

62. Talbut, "Bridge that Spanned the Great Depression," 185-186; Cochran, "History of the Cape Girardeau Bridge," 2; Legal summary, Part IX, Bridge File, MHTD.

63. Southeast Missourian, 21 January, 3, 24, 26 February, 12 March 1938.

64. Ibid., 14 June 1938.

65. Ibid., 23 June, 8 August 1939; C. W. Brown to B. Hugh Smith, 11 April 1940, Bridge File, MHTD; "Cape Girardeau Bridge, Cape Girardeau County," 9 April 1940, Minutes of Proceedings of Missouri State Highway Commission (MSHC), Secretary's Office, Missouri State Highway Commission, Jefferson City. Hereafter cited as Minutes, MSHC; Talbut, "Bridge that Spanned the Great Depression," 186.

66. Cochran, "History of the Cape Girardeau Bridge," 2; Talbut, "Bridge that Spanned the Great Depression," 186; Bliss, "Mississippi Bridge," 2; "Cape Road District Buys Bridge," Southeast Missourian 8 June 1946, newspaper clipping in Bridge File, MHTD.

67. Ibid; Legal summary, Part XI, Bridge File, MHTD; Talbut, "Bridge that Spanned the Great Depression," 186.

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69. "Inter-Department Correspondence, Memo to File," 29 August 1955; "State Highway Commission of Missouri and Illinois Division of Highways to Cape Girardeau Special Road District," 17 October 1955, Bridge File, MHTD.

70. M. S. Gwinn, District Engineer, to J. A. Williams, Bridge Engineer, 5 March 1956; Letter to Cape Special Road District, 2 August 1956, Bridge File, MHTD.

71. "Acceptance of Cape Girardeau Bridge," 8, 9 October 1956; "Cape Girardeau Bridge," 9 November 1956; "Cape Girardeau Bridge," 12 June 1957, Minutes, MSHC; "Inter-Department Correspondence, Memo to File," 7 June 1957; "Agreement between Illinois and Missouri for Maintenance, Repair, Reconstruction, and Operation of the Bridge over the Mississippi River at Cape Girardeau, Missouri," 29 June 1957, Bridge File, MHTD.

72. Walter H. Ford, Mayor of Cape Girardeau, and Howard H. Boyd, President, Chamber of Commerce, to John Williams, Bridge Engineer, 13 June 1957, Bridge File, MHTD; Bliss, "Mississippi Bridge," 2.

73. Missouri State Highway Department, "Bridge over Mississippi River, State Road from Cape Girardeau, Mo. to Rt. 146 Ill., at Cape Girardeau, Project No. F-874-1(1)," Plans for Bridge Floor Modification, 19 July 1962, Bridge Division, Missouri Highway and Transportation Department, Jefferson City.

74. Arthur N. Alkire, Men of Affairs in Greater Kansas City, 1912 (Kansas City: Kansas City Press Club, 1912), 110.

75. Sara Mullin Baldwin, Who's Who in Kansas City, 1930: Biographical Sketches of Men and Women of Achievement (Hebron, Nebraska: Robert M. Baldwin Corporation, 1930), 88.

76. Ibid., 10.

77. H. H. Lotter, "Five New Highway Bridges Across Mississippi River," Engineering News Record 99 (1927): 431; "Seven New Bridges," 183-184.

78. `John Lyle Harrington', in "Historical Notes and Comments: Obituaries," Missouri Historical Review 36 (1942): 507-508.

79. Baldwin, Who's Who, 97; Dick Fowler, Leaders in our Town (Kansas City: Burd and Fletcher Company, 1952), 209-212.

80. Dun and Bradstreet, Million Dollar Directory: America's Leading Public and Private Companies (n.p.: Dun and Bradstreet, 1993).

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82. American Big Business Directory (Omaha: American Business Information, 1993), 2:2437.

83. Frederick Lewis Allen, The Great Pierpont Morgan (New York: Harper and Brothers Publishers, 1949), 167, 179-180; Clay Fraser, Colorado Bridge Survey (Loveland: Fraserdesign, n.d.), 12-13.

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